

NORTHERN CALIFORNIA BOTANISTS

BOTANICAL LEAFLETS

ISSUE 12

FALL 2013



PRESIDENT'S MESSAGE

The weather is starting to turn and it is becoming fall. There is snow on Mt. Shasta and Mt. Lassen that I can see on my commute to Shasta College. I taught General Botany last spring filling in for the instructor while out on maternity leave. I am teaching Horticultural Identification this fall filling in for the instructor who is out on medical leave. This is a series of three 1 unit classes. I have finished Deciduous Trees and now am teaching Flowering Perennials. The last will be Evergreen Trees. I am learning a lot about the plants that get used in our urban land-

scapes which has been very interesting.

It is time to finish field work in the high country with the snows coming. There were lots of fires again this last summer. Some close to where we live and others farther away. I guess that will be the norm each year now.

After a quick spring wildflower season there was some hot weather early in the summer that got the summer wildflower season going. The summer wildflowers in the mountains seemed to last a little longer

this year in the areas I was visiting.

We are busy planning our 2014 Symposium which will be January 13 and 14, 2014 at California State University, Chico. See details within the newsletter about the symposium. We plan to have workshops on January 15, 2014 as well. It is really going to be a great event!

Have a great fall with your many vast botanical adventures. And hope to see you in January at the Symposium.

Linnea Hanson
President

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NORTHERN CALIFORNIA BOTANISTS SYMPOSIUM! 13-15 JANUARY 2014—REGISTRATION IS OPEN!

The Northern California Botanists will host their 6th symposium at California State University, Chico, January 13–14, 2014 with workshops to follow on January 15. This symposium will emphasize climate change and is titled *Northern California Plant Life—Botany for a Changing World*. See page 2 and 9 for more information.

MYSTERY PLANT

This native summer-annual grows up to knee-high or more, and has sticky vegetative parts and fruits. Flowers have a prominent nectary and 8-32 long stamens. Plants are most commonly found on gravel bars along rivers and creeks. This species ranges from Northern California to eastern U.S. and Canada.

Photo by Robert Fischer



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2014 NCB SYMPOSIUM!(CONTINUED)

Northern California Plant Life—Botany for a Changing World will emphasize climate change in sessions providing updates and perspectives on topics such as alpine ecology, rare plants, horticultural conservation, fungi, pollinators, wetlands, and new botanical discoveries. A dedicated poster session and reception will be held at the end of the first day's presentation. The Keynote address will follow Monday's night's banquet and be delivered by Dr. David Ackerly, University of California, Berkeley. The

Plenary talk will be given on Tuesday by Dr. Kabir Peay of Stanford University.

Workshops will follow on Wednesday, January 15. The first workshop is a repeat of the popular "Regulatory Framework" taught by Samantha Hillaire, consulting botanist.

The second is a combination workshop/field trip "Introduction to Mushroom Foraging and Identification" by Phil Carpenter, president of the Fungus Federation of Santa Cruz.

The third is a workshop on "The Biology, Ecology and Conservation of Whitebark Pine in California" and will consist of short talks by invited speakers in the morning and data sharing in the afternoon. This workshop is being organized by Diane Ikeda, Regional Botanist with the U.S. Forest Service, Pacific Southwest Region Office.

Visit our webpage at <http://www.norcalbotanists.org> for more information.

2014 SYMPOSIUM KEYNOTE ADDRESS—DR. DAVID ACKERLY TO ADDRESS CLIMATE CHANGE AND CONSERVATION

We are pleased to announce David Ackerly as the Keynote speaker for the Northern California Botanists 2014 Symposium. Dr. Ackerly is a distinguished professor in the Department of Integrative Biology at the University of California Berkeley. Dr. Ackerly's research examines the ecology and

evolution of California's native plants. His interests include the adaptations of plants to the Mediterranean-climate, the diversity of drought-tolerance and post-fire life-history strategies, and the importance of topography and microclimates for plant distributions. His current research on the potential im-

pacts of climate change on native vegetation, emphasizes the San Francisco Bay Area and the implications for open space management and biodiversity conservation. Dr. Ackerly's talk will be titled "Climate Change and Conservation: Visualizing our Future."

PLENARY PRESENTATION: DR. KABIR PEAY

The Plenary Presentation on Tuesday will be by Dr. Peay of Stanford University. Dr. Peay is an Assistant Professor in the Biology Department. His research focuses on the biology & ecology of symbiotic interactions. His studies concentrate on one of the most pervasive forms of symbiosis in terrestrial ecosystems – the mutualistic association between soil fungi and plant roots known as mycorrhizal symbiosis. Mycorrhizal fungi are incredibly diverse and among the primary agents of carbon and nutrient cycling in soils. As the primary mechanism for plant nutrient uptake they contribute immensely to shaping the plant communities that define our natural ecosystems.

In his work, he characterizes mycorrhizal fungal communities using DNA barcodes and works to elucidate the ecological processes that structure natural communities and the links between community structure and the cycling of nutrients and energy. Working at multiple spatial-scales, he looks at how these fungi interact with their plant hosts at the scale of individual root systems as well as comparing mycorrhizal communities across diverse biomes, such as the western Amazon and Malaysian Borneo. By integrating these diverse spatial scales he hopes to build a 'roots-to-biomes' understanding of plant-microbe symbiosis.

This research comes at a time when we are just beginning to appreciate the importance of positive interactions with microbial organisms in shaping everything from human health to the evolution of life on land. With this in mind, Dr. Peay hopes his work leads to a greater insight into the role of cooperation in nature and a better understanding of how to approach current environmental problems, such as global climate change.

Dr. Peay's talk will be titled "Ecology from the ground up: A roots-to-biomes look at mycorrhizal community structure & function."

NORTHERN CALIFORNIA BOTANISTS IN ACTION

This issue of Leaflets features a continuing series that highlights well-known to possibly less-well-known botanists, with photographs from the present to several decades back. If you have unpublished pictures of Northern California Botanists to share, please send jpegs and relevant information to rschlising@csuchico.edu



Matt Brown, shown here while working for the Plumas National Forest. Matt had to start with a very short field vest (a joke among him and his colleagues). After graduation from Chico State, he obtained his master's degree at UC Davis, on *Cypripedium fasciculatum* on the Plumas

National Forest. He has now served as Botanist for several seasons on the Eldorado National Forest, providing much input on NEPA projects.



Sandra Morey is shown as a student, learning plants in basalt boulders at the Eagle Lake Field Station (Lassen County), where she soon co-authored a paper on biology of *Camissonia tanacetifolia*. So much more than plants now holds her attention, since she serves as Deputy Director for the Ecosystem Conservation Division of the California Department of Fish and Wildlife.



Jenn Yost, a two-time recipient of NCB research grants while at UC Santa Cruz, studies how closely related species of goldfields (e.g., here *Lasthenia fremontii*, *L. californica*, and *L. gracilis* at Table Mountain in Butte County) partition the habitat and co-occur within meters of each other in the vernal pool landscape. She invests in good knee pads to conduct belly botany. Jenn is a new faculty member at Cal Poly, San Luis Obispo.



Jim Jokerst (deceased) is celebrated with a bronze plaque bearing his name on Table Mountain near Oroville. Before his life was cut short by an accident, he accomplished much in northern California botany: as a consultant, in published writings (e.g. the Jepson

Manual and on vernal pools), and in conservation of California plants and their habitats. Friends of the Herbarium at Chico State award a scholarship yearly in his honor.

2013-2014 STUDENT RESEARCH SCHOLARSHIP AWARDS

Northern California Botanists is pleased to announce the recipients of this years research scholarship awards. As in the past, we received many worthy applications. This year we will be awarding 10 scholarships of \$1,000 each.

The Shasta Chapter of the California Native Plant Society (Shasta, Lassen, Modoc, and Siskiyou Counties) is sponsoring one of the \$1,000 Northern California Botanists Scholarships this year. In addition, to the general NCB requirements, the recipient of the Shasta Chapter scholarship must be either doing research with relevance to the flora within the boundaries of the Shasta Chapter and/or a student from the Shasta Chapter area.

Kelsey McDonald is a Master's student at Humboldt State University.



The title of her research is "**Tidal seed dispersal of *Spartina densiflora***".

The invasive cordgrass *Spartina densiflora* may pose a threat to restoration sites and native estuaries throughout the Pacific Northwest by dispersing on tidal currents. Eradication is in progress in Humboldt Bay with the goal of complete removal by 2018 (H.T. Harvey and Associates, 2012), and tidal seed dispersal research could inform restoration and monitoring plans. This study will help determine the invasive potential of *S. densiflora* seeds floating on tidal currents by showing the number of seeds dispersing with the tides. Setting floating nets in tidal sloughs to collect seeds during flood and ebb tides can demonstrate whether the site is a seed source or sink, and show the number of seeds flowing into or out of the saltmarsh site. By placing the floating nets at the entrance to restored and invaded saltmarsh sites, this study will determine the number of *S. densiflora* seeds flowing into and out of these areas. Showing the number of seeds entering restoration sites will directly inform restoration managers and indicate the relative contribution of tidal dispersal to seedling recruitment in restored marshes. Monitoring invaded sites will help determine the number of *S. densiflora* seeds drifting away from the saltmarsh and circulating in Humboldt Bay. Testing the viability of the seeds collected in the floating nets will show percent viability of the seeds dispersing on the currents. This research will provide the information needed for planners to prioritize restoration sites based on minimizing reinvasion or eradicating populations shown to be significant seed sources. Demonstrating the level of threat posed by tidal seed dispersal of *S. densiflora* could also help planners prioritize restoration monitoring and early detection of the invasive species.



SHASTA CHAPTER, CNPS, SCHOLARSHIP WINNER

Jane Van Susteren is a Master's student at San Francisco State.

The title of her research is "**Cliff notes on California's *Sedum***".

California *Sedum* within subgenus *Gormania* are difficult to identify. Some of the characters used to separate species are continuous, such as rosette internode length and petal color. Others are only present for a very brief window; cauline leaf shape and petal length are both essential characters, but each trait is only present for a few weeks - weeks that barely overlap. Their cliff habitat makes accessing populations during the bloom period a formidable task. To raise the stakes, six of California's twelve species are rare.

I have either collected or accessed collections from the type localities of each Californian species and gathered material for molecular analysis. I intend to construct a molecular phylogeny and project observed morphological characters onto it. The resulting species boundaries will be tested against previous collections. My goal is the production of a more robust key for California's rare and common *Sedum*.

2013-2014 STUDENT RESEARCH SCHOLARSHIP AWARDS

Jason Mills is a Master's student at California State University, Chico.



The title of his research is “**Reestablishing the competitive hierarchy in an invaded California grassland through the process of habitat restoration following the prescribed burn of *Centaurea solstitialis*”.**

Land use practices in the past several hundred years have had a dramatic effect on many of California's ecosystems, resulting in large scale ecological consequences. As a result, native grasslands have become one of the state's most threatened ecosystems. Close to 90% of the plants listed on California's Inventory of Rare and Endangered Species occur within grasslands. Native species account for less than 1% of composition of most California's grasslands today. *Centaurea solstitialis* (yellow star thistle, Asteraceae) was introduced to California in the mid 1800's and has spread widely into exposed grasslands. It is highly invasive and is currently the most widely distributed noxious weed in California. Prescribed burns have been demonstrated to be an effective management tool for reducing the density and seed bank of *C. solstitialis* by as much as 99%; however, further research has shown that without continued management, it reestablishes in treated areas.

I hypothesize that planting native grassland species will suppress the reestablishment of *C. solstitialis* following a burn. Seeds of the perennial bunch grasses, *Stipa pulchra*, *Bromus carinatus*, and *Elymus glaucus*, along with *Grindelia camporum*, and *Madia elegans* were collected within the watershed of Big Chico Creek in the summer of 2012 and propagated in a greenhouse. Two separate fields of *C. solstitialis* along Big Chico Creek were burned in the fall of 2012. Three separate 4m x 7m blocks were established in each of the fields. And systematically planted with 1,152 native grass plugs, 216 *Grindelia* plugs, and 48 1m² direct seed treatments of mixed bunch grasses and *Madia elegans*. Species composition and growth of each treatment will be monitored. The use of these species in restoration efforts may be able to shift the competitive advantage back toward native grassland taxa in order to mitigate against future *C. solstitialis* infestations.

Juliet Oshiro is a PhD student at the University of California, Santa Cruz.



The title of her research is “**Climate change and plant phenology in Santa Cruz County, California**”.

The timing of plant phenological events may shift in response to climate change, since plant phenology is often controlled by environmental factors such as temperature and precipitation. In this study I use a dataset documenting flowering phenology metrics from 1989-present, along with climate data from weather stations and PRISM to assess whether plant phenology and climate are correlated. I am recording first observed flowering date, length of flowering and last flowering date for all plants at four inland sandhill chaparral and six grassland sites in Santa Cruz County. Grassland sites are distributed along a coastal-to-inland gradient, which I hypothesize represents a gradient in climate buffering due to maritime influences. I hypothesize that: 1) climate, and therefore flowering phenology, will change over time 2) species in grassland sites closer to the coast will shift their phenology later in the season as compared to inland grassland sites, due to differences in climate; and 3) grassland sites closer to the coast will experience less climate change, and thus less phenology change, over time as compared to inland sites. Preliminary results, however, show flowering phenology and climate change patterns opposite to those hypothesized: coastal sites and plants have more climate and phenology changes over time, and have an earlier first flowering date than inland sites. I am continuing to survey the study sites and am planning greenhouse experiments to further test my hypotheses in a more controlled setting.

2013-2014 STUDENT RESEARCH SCHOLARSHIP AWARDS

Catherine Wade is a PhD student at the University of California, Santa Cruz.

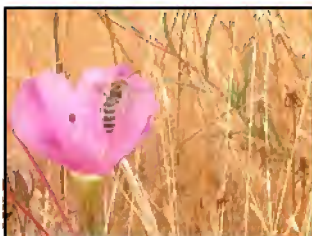
The title of her research is **“Impacts of snow and rain change on native and invasive sagebrush steppe fire fuel properties”**.



Cheatgrass (*Bromus tectorum*), one of the most ubiquitous invasive plant species in the West, has rapidly and dramatically transformed many native ecosystems since its accidental introduction in the late 1800s and continues to spread into higher elevations, where ecosystem sensitivity to climate change may be heightened. Cheatgrass densely colonizes bare ground in shrublands, becomes extremely flammable after its early senescence, and increases fire frequencies to the point that native species cannot recover, thereby perpetuating its own dominance. Its ability to spread very rapidly and the difficulty of controlling the invasion threaten even the most expansive native ecosystems. Sagebrush steppe is one of the most widespread western shrubland ecosystem types, yet one of the most vulnerable to displacement by cheatgrass, which has already come to dominate 20% of what was once sagebrush steppe and threatens to displace a substantial portion of the current area of sagebrush steppe in the coming decades.

My research examines the consequences of snow and rain change on native and invasive fire fuel properties in a cheatgrass-invaded sagebrush steppe ecosystem within Inyo National Forest land adjacent to the Valentine Eastern Sierra UC Reserve, Mono County, CA. My study uses snowpack manipulations during the winter (both increases and decreases in snow depth to capture uncertainty in climate model projections) to assess impacts on phenology, fuel moisture content, species composition, fuel biomass, and cheatgrass density during the growing season. I also conduct rainfall manipulations at different times during the growing season and measure the physiological responses of cheatgrass and native vegetation to altered precipitation timing. By directly testing various climate change scenarios on cheatgrass and sagebrush steppe ecosystem fire fuel properties, my research objective is to elucidate the range of possible impacts with respect to the extent of cheatgrass invasion and the likelihood of alterations to fire regimes that may occur under a future climate to provide a scientific basis for management decisions.

Angelita Ashbacher is a PhD student at the University of California, Santa Cruz.



The title of her research is **“Cascading effects of native pollinator loss on California wildflower communities”**.

Environmental changes can impact important interactions within ecological communities. The mutualistic relationships between plants and pollinating Hymenoptera may be broken apart when nectar or pollen quality is diminished as a result of water stress and increased temperatures. Decreased interactions between key species vital to maintaining the mutualistic network between plants and pollinators could influence the composition of plant communities over time. This is of particular concern in areas with high rates of endemism and biodiversity such as the California Floristic Province. My research aims to understand how water stress and increased temperatures brought on by climate change will impact native wildflower communities through the plant-pollinator interaction in three habitat types along the central coast of California: Chaparral, Grasslands and Sand hills. Preliminary results using *Bombus* species show differences in pollination network structure between habitat types and variation across a coast to inland gradient. I am testing the impact of increased temperatures and water stress on plant-pollinator interactions in native wildflower communities using a combination of field surveys, measurements across natural gradients, and highly controlled growth chamber and greenhouse experiments. Ultimately, this study will lead to a better understanding of the role of plant-pollinator interactions in shaping wildflower communities and the resilience of these interactions in the face of a changing environment.

2013-2014 STUDENT RESEARCH SCHOLARSHIP AWARDS

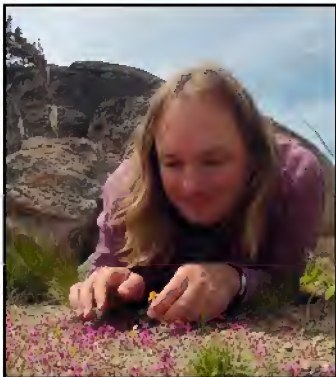
Rachael Olliff is a Master's student at Humboldt State University.



The title of her research is: **"A question of synchrony: phenological cuing in *Lathyrus littoralis* and one of its important pollinators, *Habropoda miserabilis*"**

Phenology (timing of recurring life cycle stages) is an important part of ecology that is often overlooked. It determines how and when species interact with each other in time, which, in turn impacts their life histories. The phenology of plants and their pollinators has become an important conservation concern in light of climate change. Plants and insects often rely on abiotic cues in their environment as signals for when to bloom and emerge from their nests. As abiotic factors like temperature and moisture are altered, species-specific shifts in phenology may occur. As a result, there is a strong potential for phenological mismatch to occur between plants and their pollinators due to climate change. Climate change will have the greatest effect if the phenological cues for plants and their pollinators differ. For this study I will characterize the current blooming phenology of *Lathyrus littoralis* (Silky beach pea) and the flight season phenology of one of its main pollinators, *Habropoda miserabilis* (Dune Silver Bee), in the north spit of Humboldt Bay. I will also investigate potential phenology cues in these species by measuring abiotic factors throughout the year and correlating them with any observed spatial variation in the phenological timing. I will then create a local citizen science program that will track the phenology of these species over time, gathering data for both the National Phenology Network and the California Phenology Project. Results of this study, and continued citizen science observations, will inform land managers about potential phenology mismatch issues that may face not only *L. littoralis*, but other coastal dune flora.

Lars Rosengreen is a Master's student at San Jose State.



The title of his research is **"Is yellow more mellow? Exploring the relationship between corolla color and stress tolerance in skunky monkeyflower (*Diplacus mephiticus*)"**.

Diplacus mephiticus (Greene) G. L. Nesom (syn. *Mimulus nanus* var. *mephiticus*; "skunky monkeyflower") is a diminutive summer annual found at higher elevations in the Sierra Nevada mountain range and the western Great Basin of California and Nevada. Individuals in this species can have either yellow or magenta corollas. In some cases, populations are polymorphic, containing a mixture of both yellow and magenta-colored individuals. Based on herbarium collection records, magenta morphs of *D. mephiticus* tend to be found at higher elevations than yellow morphs. Are magenta morphs better able to tolerate the harsh environmental conditions of high elevations? Do pollinators play a role? Perhaps some pollinators preferentially visit one color morph over the other. Collection records also show that over the past 100 years, specimens have been collected at progressively earlier times of the year, approximately 21 days earlier in 2012 than in 1912. If color morphs differ in stress tolerance, has one color morph become more common over the same time period?

With this study I intend to answer these questions. I am examining herbarium collections of *D. mephiticus* to determine if there has been a historical shift in corolla color after controlling for other sources of variation. I am comparing color morphs growing in polymorphic populations to see if they differ in $\delta^{13}\text{C}$ water-use efficiency or effective quantum yield of photosystem II, two physiological measurements associated with stress. I am also observing the flowers of both color morphs using compact video cameras to determine if pollinators discriminate between morphs. Together, the results of this research should provide a more complete understanding of how physiological and historical mechanisms may influence flower color.

2013-2014 STUDENT RESEARCH SCHOLARSHIP AWARDS

Bronwen Stanford is a PhD student at the University of California, Santa Cruz.



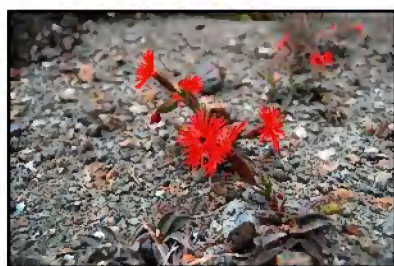
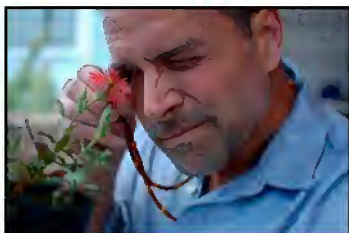
The title of her research is **“The effect of compensatory mitigation on wetland landscape position and function”**.

I propose to evaluate the effect of wetland mitigation on ecological function through looking at changes in landscape-scale patterns of wetlands across the Bay Area. I will focus on constructed and restored mitigation projects. Hypothesized landscape-scale differences between mitigation wetlands and natural wetlands include landscape position, connectivity, and hydrologic regime, all of which could affect the resulting plant communities, functional diversity, and resilience of these wetland systems. I will first test whether mitigation projects tend to create wetlands with a different landscape position or level of connectivity to other water features. Next, I will look to see if this has a detectable effect on plant communities and functional diversity in the mitigation wetlands compared to natural wetlands.

To address these questions I intend to use a combination of remote sensing, field measurements, and experimental manipulations. Remote sensing will allow me to evaluate wetland landscape position over a large area and over time. Field measurements will provide data on species composition and abiotic conditions within paired natural and constructed/restored mitigation wetlands. If I do find differences in landscape position between natural and constructed/restored mitigation wetlands, I will use experimental manipulations to identify mechanisms through which these differences might affect ecological functioning and species composition. By combining landscape and wetland-level analyses I hope to be able to detect both large-scale changes and mechanisms acting on individual wetlands.

Scott Simono is a Master's student at San Francisco State.

The title of his research is **“Morphological, cytological, and molecular evidence for redefining the identity of red flowered *Silene* (*Caryophyllaceae*) in California**



In the current circumscription for *Silene* (*Caryophyllaceae*), the former *S. californica* is accounted for as a subsp. of *S. laciniata*, and as a new species, *S. serpentinicola*, endemic to serpentine soils of northwestern Del Norte County, California. *S. laciniata* subsp. *californica* is differentiated from other subspecies of *S. laciniata* by having a few flowered, seldom branched inflorescence and variations in leaf, capsule, and fruiting calyces shape, characters *S. laciniata* subsp. *californica* shares with *S. serpentinicola*. Besides a limited distribution and serpentine endemism, *S. serpentinicola* is differentiated from *S. laciniata* by a smaller stature, corolla color, petal morphology, pubescence, and different chromosome numbers. My fieldwork and a review of herbarium specimens reveals many populations in California that match the characters used to define *S. serpentinicola*. Historic floristic treatments and monographs of *Silene* have differed in their definition and description of diagnostic characters. Thus, many populations formerly known as *S. californica* have been inconsistently accounted for and not described by any current account based on the new taxonomy. In a recent study, molecular data was used to infer phylogenetic relationships of the mostly polyploid North American *Silene*. No evidence for a relationship between *S. laciniata* subsp. *californica* and the other subspecies of *S. laciniata* was found. It was shown that California *Silene* are allopolyploid species that likely formed recurrently from separate hybridization events. Since only one population was used to represent *S. laciniata* subsp. *californica*, and *S. serpentinicola* was not included, nothing could be inferred about the identities and relationships of populations within this red flowered group. Thus many former *S. californica* populations are orphaned; their identity and relationships remain undescribed. These may represent unique lineages in need of recognition and protection. My goal is to help define the identity of these *Silene* with field, greenhouse, cytological, and molecular data.

STIPENDS (\$200) FOR COLLEGE STUDENTS ATTENDING 2014 SYMPOSIUM

Northern California Botanists will provide a number of stipends to help cover expenses of travel, lodging, meals, and registration for current college students who wish to attend the NCB symposium in January 2014.

More information and the application form can be found on our webpage. Get your applications in early. Once verified, awards are given on a first-come basis.

For questions, please contact Daria Snider at dsnider@ecorpconsulting.com. Applications must be received by 6 December 2013 and should be emailed to Daria Snider at the above email address. Applicants awarded stipends will be notified by email in late December. The check for \$200 can be picked up at the registration desk at the conference in January

Requirements:

- 1) Must be a current college student,
- 2) Must provide evidence on application form of interest or involvement in plant sciences, and
- 3) Must register for the NCB symposium by 31 December 2013.

CALL FOR POSTERS!

The NCB symposium planning committee invites you to bring a poster to share your work and knowledge of the biology, ecology, conservation and/or management of our Northern California plant life with others at the 2014 Symposium. This will be a great opportunity for continuing education

and networking. A late-afternoon session on Monday, January 13 is a dedicated poster session. Poster authors are requested to be present with posters during this 2-hour session. Deadline for submitting Poster Abstracts is December 1, 2013. Addi-

tional information can be found on the website at: www.norcalbotanists.org/symposia_callforposters.htm

Contact Barb Castro for more information at barbcastro@hotmail.com

2014 SYMPOSIUM—OTHER EVENTS

Lunchtime Discussion: Join our optional discussion forum during the Monday lunch break.

Student Career Discussion

Attention students! Are you curious about what awaits you on the other side of your diploma? Come to the NCB 2014 Student Career Discussion to find out! The specific format is still

being developed but more information will be posted on our website soon.

This will be a free, lunchtime event. Lunch will be available to purchase at the Marketplace Café in the BMU prior to the event.

California Botanical Society Mixer:

Join the **California Botanical Society** on Sunday night prior to the Symposium for an evening of botanical discussion, socializing, and fun. The **CBS Mixer** will be held at the Madison Bear Garden in Chico from 6:00 - 8:30. Pre-register through NCB.

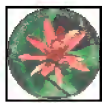
2014-2015 STUDENT RESEARCH SCHOLARSHIP AWARDS

Northern California Botanists provide competitive botany and plant ecology research scholarships to undergraduate and graduate students from northern California colleges and universities.

Applications for the 2014-2015 school year will be posted on our website in November and are due in March.

A flyer will also be available for post-

ing. Please help get the word out by letting botany and plant ecology students and faculty know of this opportunity.



NORTHERN CALIFORNIA
BOTANISTS

P. O. Box 8042
Chico, CA 95927-8042

Save the Date!
NCB Symposium

January 13-15,
2014

Registration is
now Open!

MEMBERSHIP APPLICATION/RENEWAL

Name: _____

Affiliation: _____

Address: _____

City: _____ State: _____ Zip: _____

Email: _____

MEMBERSHIP DUES:

_____ Individual \$25.00 _____ Student/Limited Income \$15.00

_____ Family or Small Business/Non-Profit (two memberships) \$40.00

In addition, I would like to donate \$_____ to Northern California Botanists to help fund NCB programs and student research scholarships.

Make checks payable to "Northern California Botanists" and mail to:

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